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SOURCE Meditsinskiy Rabotnik, Vol XVI, No 14 (1134), p 4, columns 1-4.USSR SURGICAL USE OF DRUGS WITH CURARE EFFECT

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During the past decade, intratracheal anesthesia with vaporized or gaseous anesthetics in combination with an uninterrupted supply of oxygen has been widely accepted.

Experience has shown that this method permits difficult surgical operations with a minimal requirement of the principal anesthetic. For instance, such operations as resection of the thoracic part of the esophagus or removal of a lung or a portion of a lung, which continue for 3-4 hours, require the use of only 80-120 milliliters of ether. However, a still greater reduction in the quantity of anesthetic is possible when the method of intratracheal anesthesia is combined with the administration of preparations of curare or of drugs having a similar activity.

It is generally known that even when anesthesia is sufficiently profound, the strain in the abdominal muscles is often not relaxed. To relax these muscles, it is necessary to increase the dose of the anesthetic. A combination of anesthesia with administration of curare preparations or drugs having a curare action permits complete relaxation of the musculature with a minimal use of ether. Curare preparations block the transmission of impulses at synapses of the skeletal musculature. As a result, relaxation of striated muscles occurs. This relaxation is essential in surgical operations.

A number of experimental investigations have demonstrated that curare, as such, is not toxic. The death of an animal upon administration of sizable doses of curare actually results from asphyxiation due to paralysis of the respiratory muscles. I. P. Pavlov and other investigators have noted that when the animal receives artificial respiration, it can tolerate huge doses of curare without visible change in cardiovascular activity or any general disturbance. Extensive medical application of curare in connection with various surgical operations has shown that this drug exerts no noticeable effects on either the myocardium or the parenchyma of the liver and kidneys.

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It is widely believed that curare preparations do not eliminate the pain reaction if they are applied without anesthesia. Up to now, this has been the only known aspect of the pharmacological action of curare preparations when introduced into the animal or human organism. However, medical experience shows that the action of curare is much more extensive and many-sided.

Our observations show that intravenous administration of curare preparations during shallow anesthesia eliminates not only the motor reactions but also the sensory reactions. When manipulation at the root of the lung is carried out (for instance, separation of blood vessels and bronchi), there is often a cough reflex and suppression of respiration whenever there are extensive adhesions. These reactions can be suppressed only by deepening the anesthesia to the limit or by thoroughly blocking the lung region with novocain. Unfortunately, because of the adhesions, this cannot always be done. However, if the patient receives an intravenous administration of curare or a drug possessing curare activity, all reflexes at the root of the lung disappear. If the trauma is not too extensive or deep, surgery can be continued without pronounced changes in the general condition.

These observations prove that curare and drugs which exhibit curare activity can deepen anesthesia and thus lower or eliminate the sensory reactions. To explain the mechanism of the action of these drugs when used with anesthesia, we assumed that deepening of the anesthesia is mostly connected with a lowering of basal metabolism. It is known that all conditions which affect basal metabolism also influence the depth and extent of the anesthetic state. Application of curare in combination with anesthetics helps to lower the activity of the striated musculature and consequently to lower the level of tissue metabolism.

We carried out a number of investigations on the basal metabolism of patients after preoperative introduction of curare drugs. First, basal metabolism was measured under ordinary conditions; then, after 30 minutes, diplacin was introduced intravenously. After a moderate relaxation of the musculature appeared, the measurement was repeated. As a rule, the second measurement indicated that there was a lowering of basal metabolism by 6-7%. We did not carry the relaxation of the musculature to the extent necessary in operations, because the reduction of the intensity and depth of respiration would have interfered with the investigation.

Experience has shown that curare drugs can be successfully applied to the point of complete inhibition of active respiration, or to a point where so-called directed respiration must be applied, for the purpose of bringing about relaxation of the striated musculature necessary for operations on organs of the abdominal and thoracic regions. In a number of cases, curare drugs were also used in endoscopies.

We regard severe disturbances of the respiratory function, i. e., a condition under which the respiratory movements of the patient do not secure a normal degree of gas metabolism, as an indication for complete exclusion of active respiration and for the application of directed respiration. A condition of this type usually occurs when there is considerable reduction of the respiratory surface of the lungs (e.g., in double pneumothorax, reflexory collapse of sections of lung tissue, etc.) or when there is considerable weakness of the respiratory musculature. Application of directed respiration with a constant supply of oxygen permits sufficient saturation of the arterial blood with oxygen. This has been confirmed by oxyhemometric and spirometric investigation of the gases contained in the blood, conducted by T. N. Shamarina, a collaborator of our clinic [unidentified], in the course of prolonged operations during anesthesia combined with directed respiration.

Among domestic curare drugs, diplacin has been investigated most thoroughly at the clinic.

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When operations on abdominal organs were carried out under nitrogen monoxide anesthesia, we administered 6-8 milliliters of a 2% solution of diplacin to effect relaxation of the musculature. Prolonged operations were successful in the majority of cases under these circumstances. When it was necessary to supplement the anesthesia by the use of ether or when anesthesia from the very beginning was produced by both nitrogen monoxide and ether, 1-2 milliliters of diplacin proved sufficient to effect relaxation of the musculature and deepening of the anesthesia.

To completely exclude active respiration during anesthesia with nitrogen monoxide, 15-20 milliliters of a 2% solution of diplacin were used. With ether anesthesia, respiration stops when 4-5 milliliters of a 2% solution of diplacin are administered. The curare effect of diplacin sets in 1-2 minutes after intravenous administration and continues 30-40 minutes.

During long operations, we introduced diplacin repeatedly, bringing its total dose up to 35 milliliters without producing noticeable effects on the patient's general condition. Administration of diplacin in the majority of cases causes a small rise in blood pressure amounting to 4-10 millimeters of mercury.

We regard prolonged operations under general anesthesia, as well as operations on extremities, when complete relaxation of the muscles is necessary, as indications for the application of diplacin to effect relaxation of striated musculature of the abdominal wall without excluding active respiration.

Our observations convince us that application of diplacin permits a reduction in the quantity of anesthetics, and that the whole operation is thereby much less difficult.

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